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THE net result of the twenty-eight days' tedious labor on the Chicago Custom-House trial, besides the discharge of all the defendants, has been simply to make clearer some things which seemed to be sufficiently clear at the outset. One is the unsatisfactory quality of the stone-work on the building, and its excessive cost; another the dangerous character of the original contracts, which enlisted the whole irresponsible force of stone-workers in a movement to fill the pockets of the contractor and to deplete those of the Government; another is the great difficulty, always recognized by lawyers, of proving an indictment for conspiracy; another, the extreme folly of the grand jury, which, having found out that the Government had been badly used, was apparently moved by blind wrath to lay its charges, without weighing the personal bearing of the evidence before it, in the idea that if it indicted all the principal persons who were concerned in the work, it must find among them some one who was responsible, or else that in so bad a job all the persons concerned must be banded together as a matter of course, and that if they were brought to trial the proof would take care of itself. Besides these unnecessary demonstrations there has resulted only the waste of a very large amount of time and money; the exceeding inconvenience and annoyance, perhaps the temporary discrediting, of some officials in whose honorable conduct there was from the beginning clear reason to have confidence, and of others against whom the charges have not been sustained. As to the main question at issue we see no reason to change the opinions which we expressed after the first consideration of them, or to dissent from the conclusions of Assistant Secretary French stated in his report on the subject, that there was no reason to believe in the complicity of the responsible officers of the Government; that the contractor Mueller found himself by virtue of the tender of his contract and by force of circumstances in a position where he had no need to commit himself to illegal acts, since all the interests of his workmen were engaged to increase his profits; that there was no need for any collusion but that of the timekeepers to produce a general tendency with which the superintendents were likely to find it hopeless to struggle, and against which the complicated machinery through which the Supervising Architect worked must prove inefficient.

THAT there should be some of the irritation of a disappointed chase among those who are sore on account of the abuses of this building is natural; but many of the comments which make themselves heard through the press strike us as wholly unreasonable. There is a disposition to attack the prosecuting officers for having "given away" the case. One Chicago paper exclaimed bitterly: "The verdict is that nobody was responsible — nobody was guilty; . . . . the only conclusion seems to be that it is no crime to swindle the Government." The verdict was simply that there was not reason to believe that the individuals indicted had conspired to defraud the Government. If anybody has evidence to show that one or more of these individuals defrauded the Government by other means than conspiracy, or that there was conspiracy among other persons than these, the way is still open to him. If it appears that the nation suffered by reason of an ill-judged system of administering work, which made it impossible for its officers to defend its interests adequately, and not from the dishonesty of these officers; here is on the whole reason for satisfaction rather than for wrath, and an opportunity to remember with some gratitude the officer who first protested against this system, and his successor who did his utmost to do away with it, both of whom were kept under the ban of this trial, till the court ordered them discharged without awaiting the verdict. One Chicago paper went so far as to charge the prosecuting officers with suppressing evidence which was at their disposal, and the Departments of the Treasury and of Public Justice with interfering to defeat the prosecution, a charge which possibly some other grand jury might be found to embody in an indictment for conspiracy between these two departments. That the departments, which had satisfied themselves by their own investigation that the government officers were not guilty, should have looked on their trial as a mere formality is natural enough; and that the prosecuting officers, who may be assumed to have known from the beginning the emptiness of the indictment, should not have pushed their case with all the zeal of those who had full faith in their cause, is not incredible. But to include those officers, and the administration of two departments headed by two members of the cabinet, in a general charge of conspiracy to defraud justice, is too much like the headlong proceeding of the grand jury, or the habits of political warfare, to command much general attention.

WE cited some months ago (*American Architect*, September 7, 1878) the decision of a Pennsylvania court upon an architect's claim for lien. The decision was that in that case the architect could not recover under the law of Pennsylvania, inasmuch as he had not, in the language of the statute, "performed work about the erection and construction of the building." He had made plans and specifications for the building, but had never seen it, and therefore, it was held, had not performed work "about its construction" any more than had the clerk who copied the specification; whereas in another case cited in illustration by the court, the architect, who had superintended his building, did thereby perform labor about its construction, and was consequently entitled to a lien. We have now before us the decision of the New York Court of Appeals in the case of Stryker *vs.* Cassidy, which covers substantially the same ground as the Pennsylvania case. This case is one which, having been decided by the general term against the architect, came up on appeal. The first decision was reversed, and the right of the architect to a lien under the New York statute affirmed. The court, quoting the language of the statute, which allows a lien to "any person who shall perform any labor or furnish any materials in building, altering, or repairing any houses, etc., by virtue of any contract with the owner," held that it includes all persons who perform labor in the construction and repair of a building, making no distinction between skilled and unskilled labor, or "between manual labor and the labor of one who supervises, directs, and applies the labor of others," so that the contractor who carried on the building, the mural painter who decorates it, and the architect who superintends it, have the same right to a lien as the men who lay the bricks.

IT is to be noticed that in this ruling the court takes no account of the distinction between the architect's two functions of designer and superintendent, upon which the Pennsylvania court based its discrimination of its two cases; and that its language, so far as it bears on that distinction, is not altogether clear, probably because the distinction was not in the mind of the judges. This is to be regretted, because it ought to be generally recognized and kept in mind that the two functions are distinct in kind, and there is no better way of keeping it in mind than by recording it in the decisions of the courts. If architects are to possess and use the right of lien it seems to suit with the general intent and spirit of lien laws to connect this with their service as superintendents rather than as designers, according to the Pennsylvania decision; and apart from its bearing on the question of lien, in a country where, as in ours, the differences between the duties and the professional attitudes of the architect and the builder are not as well understood as they should be, any distinction which emphasizes the separation between those of an architect's services which can be duly performed by a builder and those which cannot, should be encouraged. We have

before given an opinion as to the value to architects of a right of lien, a right which few architects will care to enforce if it is conceded to them. We do not insist on its hostility to the dignity of the profession, though that is not unimportant; but we have given two reasons, which we may briefly repeat, why we think architects do well to let liens alone. If it were their habit to enforce them, it would certainly tend to destroy the confidential character of their relation to their employers, which is the essence of their professional connection, and to make it a purely commercial relation. It would also tend in its degree to obliterate that distinction between the architect and the mechanic to which we have just referred, and which it is for the interest of them both, as well as of their common client, to maintain.

The coroner's verdict on the fall of Post & Co.'s building in Cincinnati, by which, as we mentioned last week, half a dozen men were killed, is that the loss of life was due to sending the men into the building after the fire, before there had been any inspection of it by a competent person, and that in this the insurance companies, by their adjuster, Mr. Covington, were chiefly "instrumental," a finding to which probably no great exception will be taken. To whom the technical responsibility for the loss of life belongs is not, however, of much consequence, unless it becomes a question of punishment, — whether it be Mr. Covington, or Mr. Cotteral, who examined the building, and who, we notice, is called an architect before the coroner's jury when his opinion is quoted as justification, but at other times a builder. The probability is, not that these gentlemen were more incompetent than their fellows, but that a majority of insurance adjusters or builders would have given the same opinion, being alike incompetent. The trouble lay in putting upon men of such occupations a responsibility which did not belong to them. Examination of the testimony before the coroner leaves it very doubtful whether the building was not overloaded before it was injured by the fire. This is a question which does not seem to have been carefully considered, but which might probably be answered with reasonable certainty even now by a careful and capable examination of the ruins. It would be a good thing if Cincinnati — and other cities — would profit by this experience, and provide for the inspection of their warehouses, before they burn as well as after, by inspectors who are specially trained to the work, and do not share the popular notion that a building may be expected to stand unless it shows visible signs of falling.

Various late movements in different parts of the country show the course of the labor war. The adoption of the new constitution in California has been accepted by the labor-reformers as a triumph of Kearney and his fellows, and in meetings held in several cities they have offered him their public congratulations. A resolution has been generally and enthusiastically adopted, to make a universal declaration throughout the United States, on the fourth of July, that eight hours is the proper day's work for a laboring man, with the expectation that in some way the declaration will work a corresponding reform; but without, so far as we know, any preparation for enforcing it. The bricklayers of Chicago, having set on foot the investigation of the stone-work of the Chicago City Hall, of which we have already spoken, followed it with a meeting in which they pronounced severe condemnation on Messrs. McNeil & Son, the contractors for the masonry of the City Hall, for their action in importing other bricklayers into the city when the resident workmen demanded higher wages. The meeting appears to have been captured by professional agitators, as workingmen's demonstrations are apt to be captured, especially at the West, and made occasion for airing the common theories of the socialists and of the devotees of fiat money. This unlucky tendency makes it difficult to judge of the real aspirations of the mass of working people in the country, and indeed everywhere, it not being easy to distinguish between their readiness to accept, for the sake of their own struggle against capital, any allies that offer, and their real interest in the political doctrines of their advisers. We are probably justified in believing that the working-men care mainly about hours of work and rates of wages, and comparatively little for communistic and financial theories, but the success of Kearney is none the less a warning. At the time when we write the spinners of Fall River, Mass., have ordered a general strike for higher wages, a movement which will be met by the mill-owners with a stoppage of all the mills, throwing, it is said, fifteen thousand work-people at once out of employment.

This strike at Fall River has its special point of interest, because, as in the great strike among the Durham miners in England, which has lately ended by the yielding of the men, arbitration had been proposed by the men and rejected by the masters. When such a rejection occurs it arouses sympathy for those who proposed arbitration and disappoints many persons who have come to look upon it as the panacea for labor disputes, or for all disputes. But this, it seems to us, is an exaggerated view of arbitration, which is certainly better than destructive war, and a very valuable resource when it can be availed of, but not a cure-all. While it is a natural resort when there is doubt as to the result of a quarrel, or to a person who recognizes the possibility of accepting another adjustment than that which he proposes, and is the refuge of the despairing, it is necessarily of the nature of a compromise, and therefore where compromise is impossible arbitration is inapplicable. No man, for instance, would submit his life to arbitration if he had any power to protect it. The would-be murderer could survive an arbitration if it went against him, but the victim could not. The builder or the manufacturer may know that he really cannot go on with an increase of wages, and in such a condition it is idle for him to submit his case to an arbitrator. This points to a reason why arbitration should commend itself most to the workman, — that he can always at need afford to yield something. To him the question of wages is a question of degree, and if he cannot have what he wants it is better for him to take what he can get than to stop work. With the employer, on the other hand, it very soon comes to a point where if he cannot have what he wants he must absolutely stop. There is, also, better opportunity for an arbitrator to do justice to the claims of workmen, because the conditions of the men's living and working are pretty uniform, and easily understood, while the conditions by which the employer's business is regulated are complicated, varying suddenly with individual cases, and of a kind which it is not easy, and often not desirable, to explain fully to an outside person. It is well, therefore, to accept the natural limitations of arbitration, and, while accounting it one valuable means of settling difficulties, not to look upon it as the solvent of all disputes, or be depressed when cases occur in which it is found inapplicable.

A correspondent whose letter, inasmuch as it is anonymous, we cannot print, writes to complain of the way in which some of the competition drawings for the Union League Club-House have been reproduced in our paper, saying that the plans are printed on so small a scale as to lose some of the detail, and make the lettering difficult to read. We should have been glad to illustrate still more fully and clearly than we have done the designs for this very interesting competition; but there are difficulties in the way. The designs, being for a large and complicated building, naturally required a good many drawings to exhibit them completely; to give any fair showing of them we must reproduce the most of these drawings, and they must be grouped together, each design in a single number, in such juxtaposition as to allow of easy comparison, for a clear understanding of their intention. We are not able naturally to devote all our illustrated pages to these drawings; it therefore becomes necessary to group them as closely as reasonable clearness will allow, for the sake as well of compactness as of exhibiting their relation to each other. Moreover, there are two other points which we will here ask our readers to remember, the more that they concern not these drawings only but many others. First, the drawings are prepared, not for our pages, but for general exhibition. Hence there are passages in some of them, — washes laid on with brush, and detail put in with pale ink, — which are not suited for our reproduction, and are necessarily lost or badly rendered in printing. Messrs. McKim Mead & Bigelow's design, we are sorry to say, suffered from this cause, as others have before. Second, the natural imperfection of human art is not confined to reproduction, but extends to drawings themselves. Therefore it is not safe to infer without knowledge that all which appears undefined or imperfect or crowded in the reproduction is clear and perfect in the drawing.

THE HYPÆTHRAL QUESTION.[1] I.

It is not positively known in what manner the temples of the Greeks were lighted. The ruined remains of their walls show no window-like openings intended for this purpose, and no Greek writer bears testimony upon the subject. Modern understanding of Hellenic architecture is at best so partial, and too frequently so per-

[1] Papers of the Harvard Art Club. No. 1.

verted, that the opinions held by architects and archæologists are often at variance, even when relating to subjects upon which indubitable facts throw direct light. It may be imagined, then, how discordant the views are concerning a matter in regard to which neither architectural remains nor literary documents afford decisive evidence.

It is commonly assumed that the interior of Greek temples was illuminated by the sunlight. With this as an axiom, it has naturally come to be generally believed that light was introduced to the naos from above, through an opening in the roof and in the ceiling. The plausible argument which leads to this result is in itself faultlessly conducted. We know that light was not admitted through the enclosing walls; it is no less certain that rays sufficient for the illumination of the interior of a large temple could not have found their way through the door, shaded as this was by the pteroma and generally also by a pronaos. How then, it is concluded, could sufficient light have been procured otherwise than through some opening in the roof? If the premise is accepted the result cannot be evaded. The learned Dr. Ludwig Ross, the only writer who has attacked the prevalent theory of an hypæthron,[1] while denying the existence of an orifice in the roof did, indeed, suppose that the light which would fall through the opened door would be sufficient to illuminate the naos, but did not succeed in establishing his theory, as the arguments of his opponents are, in this respect at least, convincing and conclusive. A repetition of those which prove the insufficiency of the rays which could reach the interior, even with fully opened doors and on a bright and sunny day, is here unnecessary; one needs but to refer to the exhaustive arguments of Böttticher in his monograph on this subject.[2] Moreover, there are passages of the ancient writers, notably several in the tragedies of Euripides, which show that temples were sometimes used with closed doors. Indeed, to have kept the doors wide open during all the services within would have exposed the naos, both really and ideally, but little less than would have been the case with an incomplete roof. In fact, there are many reasons to prevent the adoption of such an expedient which coincide with the practical and æsthetical considerations which will be urged against the hypæthral opening.

I believe all the light in the interior of larger Greek temples to have been artificial, and will endeavor to give reasons for this opinion, not omitting to consider any argument or testimony in favor of the hypæthron upon which weight has been laid by its advocates.

The hinge upon which the entire matter has turned is a notoriously obscure passage in the work of a Roman author. At the close of the first chapter of his third book, Vitruvius, after having divided temples into certain classes, according to their exterior forms, says: "*Hypæthros vero decastylos est in pronao et postico; reliqua omnia eadem habet quæ dipteros, sed interiore parte columnas in altitudine duplices, remotas a parietibus ad circuitionem, ut porticus peristyliorum. Medium autem sub divo est sine tecto, aditusque valvarum ex utraque parte in pronao et postico. Hujus autem exemplar Romæ non est, sed Athenis octastylos et in templo Jovis Olympii.*" This is the basis of the entire theory, and it should be remarked as being the only passage in any ancient writer that seems directly to call in question the existence of a complete roof over the naos. It is testimony of an author who wrote more than four centuries after the decline of Greek architecture, who evidently had never been in Greece, and whose remarks are often utterly at variance with the spirit and methods of the great Hellenic architects from whose treatises he compiled this part of his handbook. So far is he removed from a true understanding of Greek architecture, so little sense has he for the characteristic beauties of antique art, that it has been possible to argue, with no little force, that Vitruvius not only did not write during the reign of Augustus, as is generally assumed, but, on the contrary, that he did not live in antiquity at all, but was a monkish compiler of the Middle Ages.[3] Every editor has some emendation to the passage quoted. Some of them suppose that the examples referred to were the Parthenon, or some other octostyle temple in Athens, and the temple of Olympian Zeus in that city, or the temple at Olympia. It has been questioned, indeed, whether more than one temple was designated, and the genuineness of the "*et*" was doubted by Philander. But there was no octostyle temple in Athens dedicated to Zeus, and the "*et*" has been retained in recent editions. If the Parthenon and the temple of Zeus at Olympia are those referred to, which may be considered probable, then the latter, as well as the former, fails to correspond with the description, as it was not decastyle, but had six columns on its front. And further, if the words of Vitruvius are taken literally we are forced to conclude that the hypæthron was not used in Doric buildings, save in the two exceptional cases especially mentioned, because there were no Doric temples with ten columns upon the front, and with a dipteral arrangement of plan. It is well worthy of remark that Vitruvius declares that there was no hypæthral temple in Rome at the time of Augustus; for there, and at that time, if ever or in any place, this feature might be supposed to exist, because of the great number and variety of the temples of that city, as well as because of the far more probable adoption of such an arrangement by Roman than by Greek architects.

Dr. Ross, in his treatise, supposes Vitruvius to refer to those numerous temples in Greece which remained for generations uncompleted and unroofed, and gives many reasons for this belief. The Parthenon was finished centuries before Vitruvius wrote, but there was another octostyle temple in Athens, — the so-called Pythion, to which he may have referred, of which no more than the fact of its existence is known. The Athenian temple of Olympian Zeus happens to have been without a roof in the time of Augustus, though it had been commenced long previously. The supposition of Ross is thus possible. But it seems more probable that some curious error has slipped into the text-book of the illiterate Roman master-builder; or that some passage in a Greek original may have been wrongly comprehended. The authors whose works were before him may, somewhat as Ross supposes Vitruvius himself to have done, have made mention of those numerous temples which, from their great extent and cost, from political disturbances, or from other reasons, remained for centuries unroofed, unfinished, or dismantled.[4] And thus some reference to this fact, wrongly or only partially translated, may be responsible for the short paragraph at the end of the chapter which has caused such confusion and vexation to modern archæologists. This is naturally no more than a supposition, but it gains weight from the use of the technical term *hypæthros* by Vitruvius, which, though Greek and showing that he worked from a Greek originial, yet could hardly in that language be applied to a mere orifice in the roof, as it means, literally, without any covering whatever; ἐν ὑπαίθρῳ for instance, being used by Xenophon for the open air, τὰ ὑπαίθρα by Polybius for the open country. Only once is the word, to my knowledge, applied to buildings themselves. This is in a passage where Strabo uses it when speaking of the Artemision, *after the roof had been entirely burnt off*.[5]

As a parallel to the misunderstanding, one may suppose a mediæval chronicler to have recorded it as a fact that some cathedrals had but one tower surmounted by a spire and carried up to its full height, while the other was roofed off at a lower level. There were even more such unfinished churches in the Middle Ages, than unroofed Greek temples in antiquity. Yet, though it happens, in this case, to be sufficiently well known that the cathedral was then incomplete, this very incompleteness was copied in good faith in a building which formerly graced Union Square, New York.

If Vitruvius had indeed intended to designate a new class of temples, it is strange and exceptional that he gives no instructions in regard to executing the changes which would have been necessitated by the introduction of so unusual a feature. When to this it is added, that there was no hypæthral temple among the well-preserved buildings of Rome, that there were no dipteral Doric or Ionic temples in Greece, that Vitruvius was speaking of things he had never seen, and that the sentence was transcribed by compilers absolutely ignorant of antique building, the possibility of mistake is evident. And, as before said, testimony given by Vitruvius, in general, concerning Greek architecture, has but little scientific value and must be read with every allowance. If all his statements were to be taken as literally as these disputed lines have been, some very ludicrous and contradictory views might be based upon them.

It is not to be forgotten that this is the only passage in all literature of an earlier date than the last century which can be taken as authority for an opening in the roof, or for the supposition that Greek temples were directly lighted by the sun. Two other passages have, indeed, in the dearth of other assistance, been quoted by the advocates of an hypæthral opening, as showing its existence. Pausanias relates a story that had attached itself to a mark made by lightning within the enclosure of the temple of Olympia.[6] Phidias, on having completed his great chryselephantine statue of Zeus, and placed it within the fane, prayed for its divine acceptance and for a sign a thunderbolt was sent by the deity, which left this mark upon the floor near the statue. And, again, Apollo is said by Justin to have, on occasion, miraculously descended into his fane at Delphi.[7] To allow these two visitors to pass into the Olympian and Delphian temples, it has been urged that these buildings must have had openings in their roofs. But the tradition of the former appearance of a divine sign, or even of the apparition of the worshipped deity himself within his sanctuary, is not exactly architectural testimony, and does not necessarily prove that the ceiling was incompletely closed. The custom often observed by the Greeks, of erecting a fane over a spot which they considered sanctified by a stroke of lightning, may account for the presence of such a mark in the Olympian temple, if it there existed; while the centuries which elapsed between the ages of Phidias and of Pausanias render it possible that the legend may have arisen during the interim. Such legends were numberless; the mark of the thunderbolt may be compared to the cavity in the earth which was shown the same author in the temple of Zeus at Athens, through which it was affirmed that the waters of the deluge had retired. Yet no geological theory has been founded upon that cavity, and it is surely unjust that the history of architecture should have the exclusive advantages of such testimony. Such miracles do not need, and should not receive, any materialistic explanation. Strictly speaking,

[1] *Keine Hypaethraltempel mehr, in Hellenika, Archiv archäologischer, philologischer, historischer und epigraphischer Abhandlungen.* Band I. 1. Halle, 1846.
[2] *Der Hypaethraltempel des Alterthums auf Grund des vitruvischen Zeugnisses gegen Prof. Dr. L. Ross erwiesen.* Potsdam, 1847.
[3] *Untersuchung uber das Zeitalter des römischen Kriegsbaumeisters M. Vitruvius Pollio.* Chr. L. T. Schultz, 1856.

[4] Such temples were common in Greece: in the first two books of Pausanias alone, no less than seven are spoken of (i. 1, i. 40, i. 44, ii. 7, ii. 15, ii. 24, ii. 34).
[5] *Strabo*, xiv. 1.
[6] *Paus.* v. 11.
[7] *Just. Hist.* xxiv. 8. The words of Justin are "advenisse deum clamant (*sc.* vates) eumque se vidisse desilientem in templum *per culminis aperta fastigia*." It is more natural to suppose that the roof seemed to open to admit the god, than that it stood always open.

equal weight and belief may be allowed to each of these statements, and to the affirmation of the hypæthral opening itself.

J. T. Clarke.

BUILDING CONSTRUCTION.[1]

There is a kind of professional knowledge which it is generally assumed cannot be learned in schools, but must be acquired by frequenting offices, questioning workmen, reading circulars, private experiment, and conversation with one's brother students, followed by a long process of digesting the mass of information and misinformation so acquired, rejecting as far as may be the errors which are likely to form a large part, and arranging the remainder in some kind of order in the mind. From a part, at least, of this labor, it seems as if the student might be relieved by the help of books which should give him the benefit of the mature experience of those who have by the labor of years gathered knowledge, which when properly sifted needs but a few days to impart; but such books are rare, and the best of them leave much to be desired.

One of the most careful, the most scientific, and best arranged works of the kind is found in the Notes on Building Construction, of which Part III., treating of materials, is now before us. Some idea of the labor of collecting such information may be had from the fact that the author refers to ninety-two text-books as having been used in the preparation of the book, besides, as he says, "professional papers relating to engineering, building, etc., circulars and catalogues of manufacturers and merchants, and information given by scientific and professional men, quarry-owners, friends, and others," and it must be said that he has done the work well, the arrangement being clear and the facts presented with careful regard to the selection of the most important, and with the valuable addition of references which give the authority for statements which might be questioned. For instance, in speaking of zinc as a material for roofing, a line says that an objection to its use for such a purpose is that "it catches fire at a red heat, and blazes furiously." Probably few of us ever saw a zinc roof on fire; but any architect may be called upon to use the material for a railway shed or something of the kind, and its inflammability in such a situation is important, and we are glad of the reference to "Bloxam," through which we can investigate further in case of need.

Another good point of the book is its "modernness" of information. In it is the first practical account that we have seen of the way in which the Barff process of coating iron with magnetic oxide is carried on at a commercial scale. The little paragraphs in the daily papers are valueless compared with an authentic description like this. The still more recent process, in which heated air is used instead of steam, is referred to as being "in the experimental stage." There are, perhaps, some omissions, as in the case of the so-called "autogenic soldering," by means of the oxy-hydrogen blowpipe, which is not mentioned, although the process seems now to be sufficiently established to be worthy of a description.

Some very useful descriptions of the manner in which stones lie in the quarry, and the modes of testing stones, are given, which could have been learned only by visiting the quarries and questioning the workmen; and tables showing the qualities of the stone from all the principal quarries of Great Britain and Ireland are given, which must be invaluable to architects who use the stone from them.

Under Terra-Cotta a great deal of information is given which is particularly new and interesting; the connected subjects of the manufacture of earthen-ware pipes, roofing and paving tiles, and bricks of all kinds, are very fully treated of, and the reader is put on his guard against the tricks of dishonest makers. Under the general head of Limes, Cements, etc., there is much that is new, and more that is interesting though not new. In speaking of the mixing of mortar, the author gives very nearly the same description of the proper method as General Gillmore, and yet this method, so far as our experience goes, is never used among builders here, — of whom the good ones practise a more costly and laborious process than that recommended by the men of science. Both Gillmore's work and the book before us direct that the lime should be placed in the bed, and distributed evenly with a shovel, then water, in amount equal to two and a half or three times the bulk of the lime, poured over it all at once. Then the seething mass is to be covered up, either with a canvas, as General Gillmore proposes, or, as both books say, by throwing sand over it, two or three inches deep, and left to itself till the slaking is complete. In this way it is said that the steam is confined, and the lumps of lime heat and fall to powder better than when, as is the usual practice, a hose is turned on and two men rake and stir the lumps about, chilling them by contact with the cold incoming water, and in most cases getting the quantity of water much too large. With the very rich Thomaston or Rockland lime generally used here, there seems to be no reason why the scientific system should not be the common one, but we have ourselves never been able to muster courage to order it to be adopted.

There is much material for thought in the common processes of mortar-making and plastering, and some room for improvement. We once, with the consent of a builder of inquiring mind, tried the experiment generally recommended in the books, of slaking some lime for plastering two weeks before mixing with the sand. At the end of the two weeks the mass, soft at first, had attained the consistency of cream cheese, so that the labor of mixing the sand with it was greater than in the ordinary mode, where the sand is put directly into the hot lime, but the mortar was beautifully smooth and "fat," and made excellent work. In distinction from the scientific processes, we have heard of an ingenious mason in New Jersey who made his plastering mortar in what may be called the "natural" method, which consisted in emptying a barrel of lime on the grass, with a sufficient dose of water, and when the slaking was complete, hoeing up lime, grass, and dirt into a mixture of suitable consistency to be spread on the wall. The grass took the place of hair, the loam answered for sand, and the mortar stayed long enough on the wall for the mason to get his pay. Between these two extremes there are many varieties of work, and the young architect who finds plastering and mortar the most difficult portions of building work to superintend with certainty, will find many useful hints in this book. One simple test for ascertaining whether plastering mortar contains sufficient hair is given as follows: "If there is sufficient hair in coarse stuff (first coat) for ceilings, it should, when taken up on a slate or trowel, hang down from the edges without dropping off."

Some interesting information is given in regard to the celebrated "selenitic mortar," and tests are given which will be new to American readers. It certainly seems strange that when the addition of three pints of plaster of Paris to each bushel of lime will make a mortar which with five or six parts sand is much stronger than Portland cement with the same proportion of sand, it should have been used in this country, so far as we know, only in a part of one building.

Another material which we import and use to some extent, and would use much more extensively if the cost were not so great, is Keene's cement, or the Parian cement, which is quite similar. The receipt given in the book is to soak, in a solution of one pound of alum dissolved in a gallon of water, eighty-four pounds of calcined plaster of Paris in small lumps; the lumps to be exposed eight days to the air, and recalcined at a red heat. This process ought not to be very expensive, and the cement is admirable for base mouldings, architraves, etc., in fire-proof buildings, and for giving a polished non-absorbent surface to walls of school-houses and hospitals. The patent selenitic clay, for which no formula is given, is said to have similar properties, at still less cost.

The chapter on Iron and Steel is interesting to the scientific man, as well as the practical architect or engineer, concerned chiefly with modes of testing materials delivered, and of determining with certainty what kinds of metal will answer his purpose, so that he can specify with economy and efficiency the brands of iron that he wishes to use. Some of the tables of tests quoted from Mr. Kirkaldy, in which the area of the fracture is given, as well as the breaking stress, throw much light on the importance of considering both these characteristics in judging of the quality of wrought-iron. One of Mr. Kirkaldy's tables gives some facts which will be new to most readers. According to this, bars of chisel cast-steel, highly heated and cooled *in oil*, showed an average breaking weight of ninety-six tons per square inch, while the same bars heated and cooled in water broke under a strain of forty tons per square inch. With less heat the difference was not so great, but is still surprising, and perhaps is connected with the well-known property which oil has of toughening glass under similar treatment.

A useful table is that giving the thicknesses of ordinary lead pipes, and the pressures to which each class may be safely subjected. The weights seem rather light for practice, but margin enough can easily be allowed for effects of water-hammer; and in the case of heads up to four hundred or five hundred feet the table would save either tedious calculation or hazardous guessing.

Another table, quite characteristic of the sensible and straightforward usefulness of the book, is found under the head of Paints, giving the number of pounds of white lead, oil, turpentine, and dryer required to cover one hundred square yards of "new wrought deal," both inside and outside, from one to four coats. Similar calculations are given for varnishes.

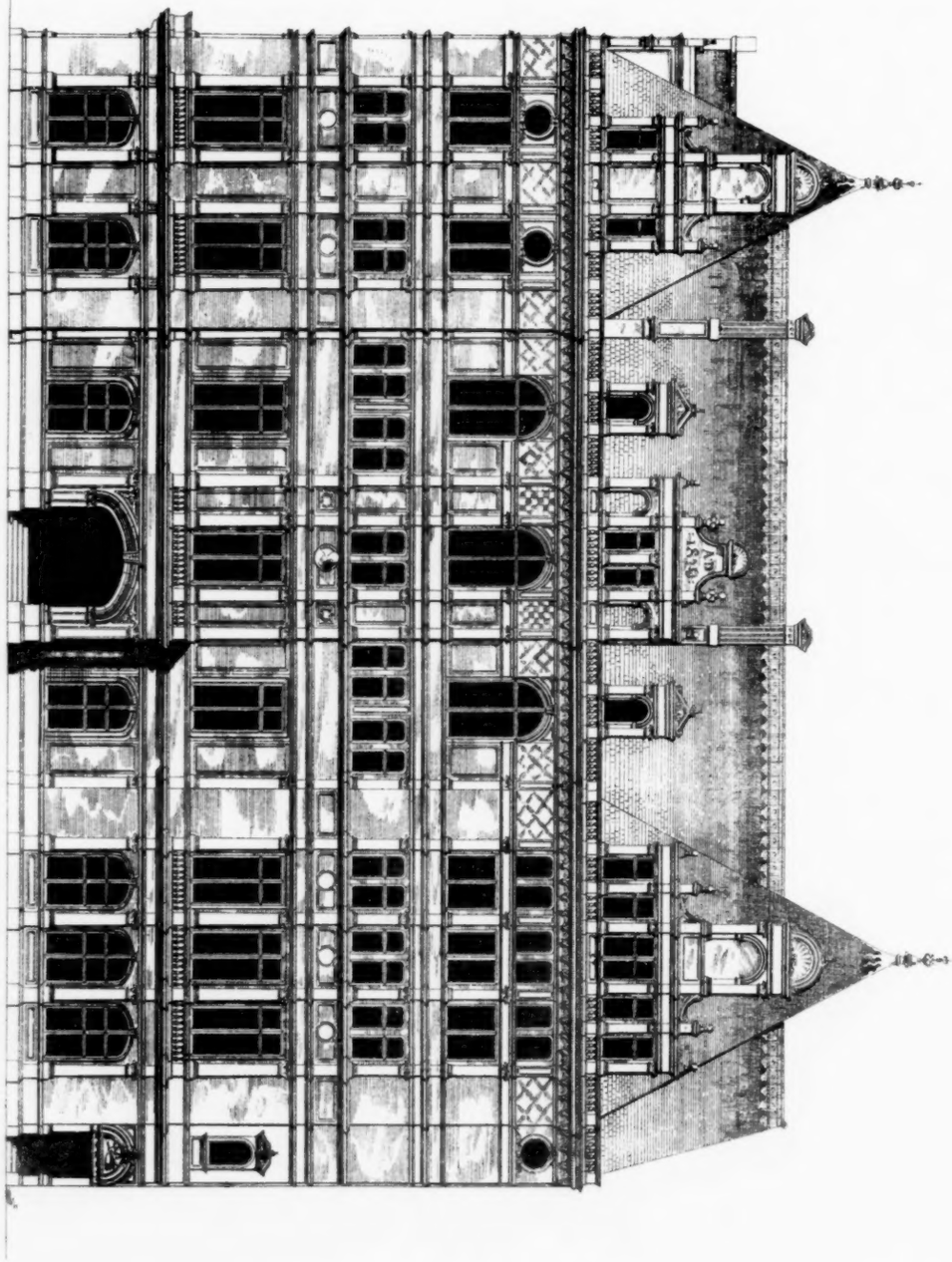
Throughout the book notes of the common adulterations of the various substances are given and the means of detection, and the whole has a truthful and scientific air very pleasant after the untrustworthy descriptions of circulars and the collections of doubtful recipes out of which most of us have to sift laboriously an approximation to accurate knowledge.

The only thing in the book which the reader will regret is that the tenacious conservatism of his public should have made it necessary for the writer to use English weights and measures instead of the metric system. In nothing does the absurdity of the English system appear more than in tables of strains given in tons, where some readers will be uncertain whether the old ton of 2,240 pounds is meant, or that of 2 000 pounds, unless it be formulas for mixing cements and concretes in which the quantities are given in bushels, and accompanied by a schedule of eight different kinds of bushels.

[1] *Notes on Building Construction. Part III. Materials.* Arranged to meet the requirements of the Syllabus of the Science and Art Department of the Committee of Council on Education, South Kensington. London, Oxford, and Cambridge: Rivingtons. 1879.

The Australian Exhibition. — The next world's fair, which is to be held at Melbourne, the capital of the province of Victoria, will open October 1, 1880, and close March 31, 1881. The buildings, which will cost out $500,000, are to be supplied by the government.

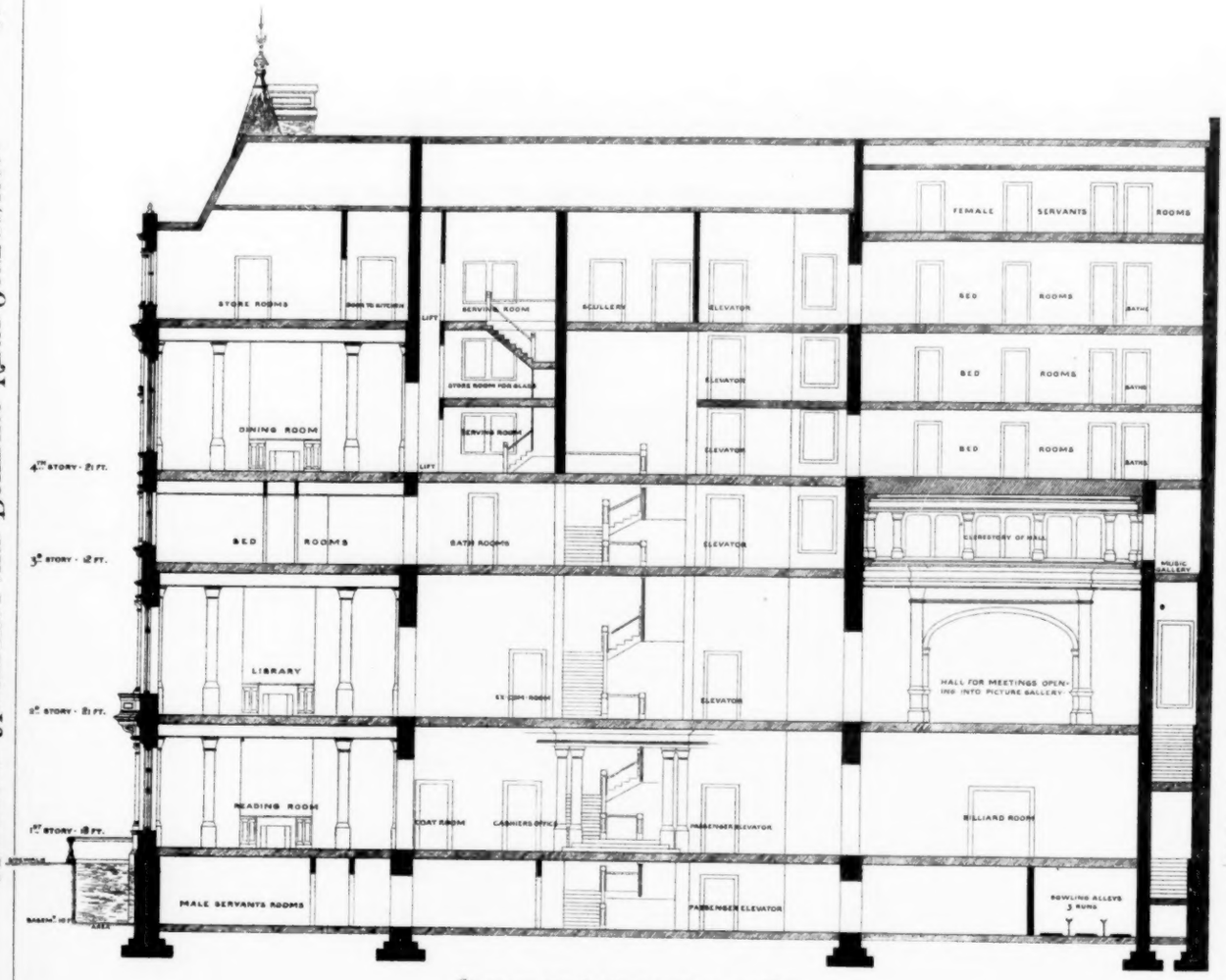
DESIGN FOR THE UNION LEAGUE CLUB-HOUSE NEW YORK.



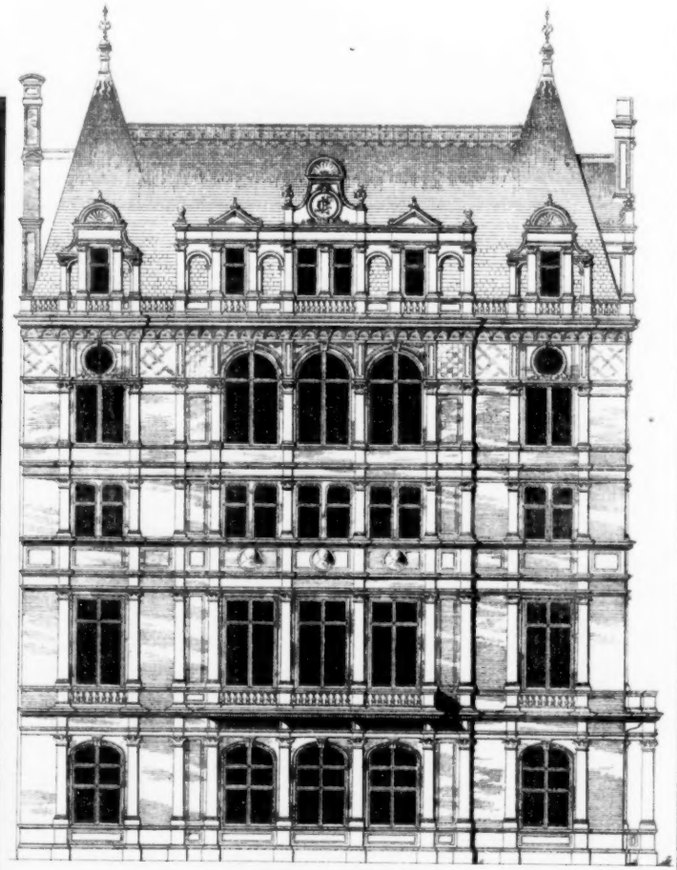
Thirty-ninth Street Elevation.

DESIGN FOR THE UNION LEAGUE CLUB-HOUSE NEW YORK

G. D. Gambrill & H. E. Ficken, *Architects.*



Skeleton longitudinal section thro' Hall.

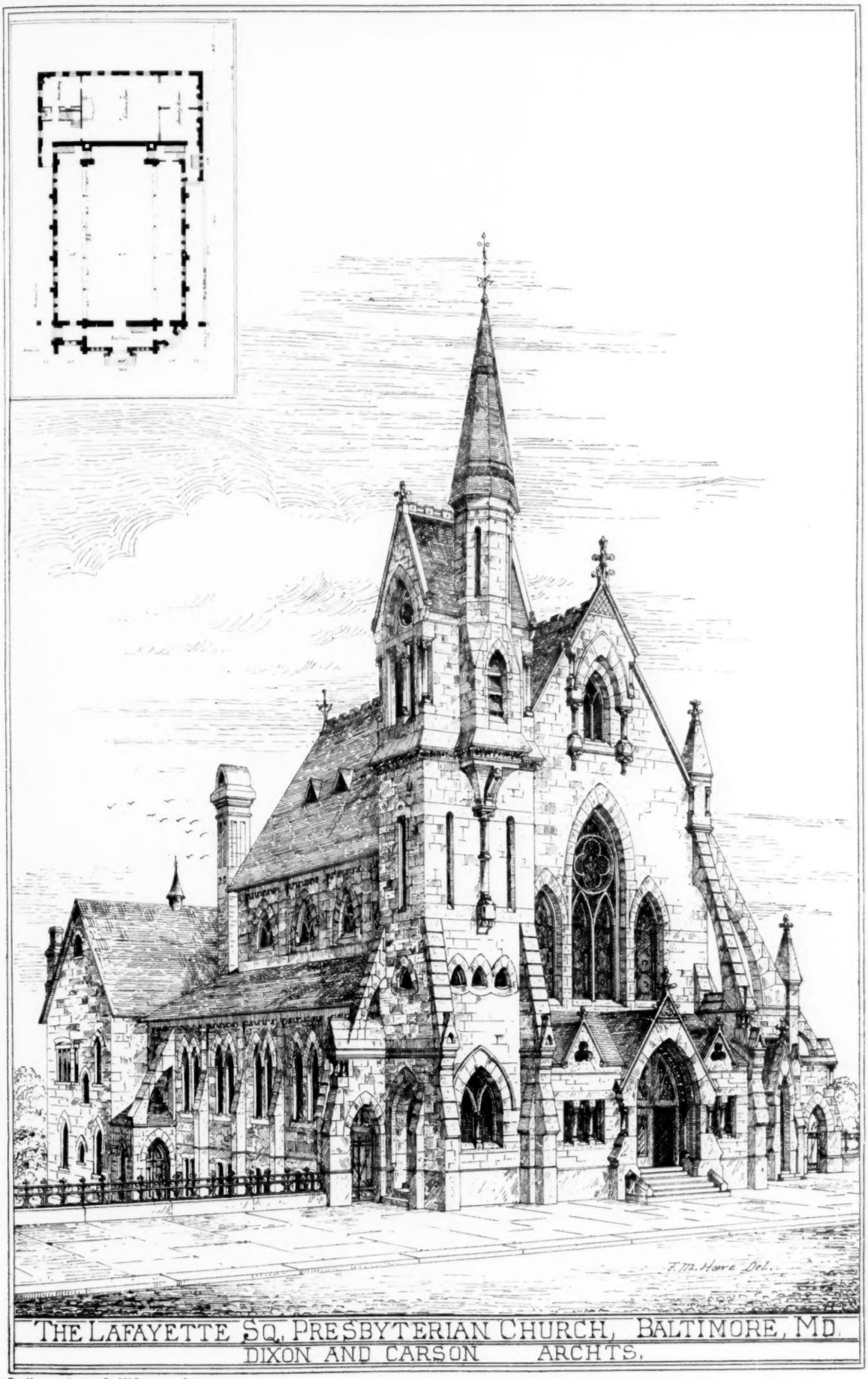


Fifth Avenue Elevation.

C. D. Gambrill & H. E. Ficken
Architects.

DESIGN FOR THE UNION LEAGUE CLUB-HOUSE NEW YORK.

THE HELIOTYPE PRINTING CO. 330 DEVONSHIRE ST. BOSTON.



THE LAFAYETTE SQ. PRESBYTERIAN CHURCH, BALTIMORE, MD.
DIXON AND CARSON ARCHTS.

THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON.

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR THE UNION LEAGUE CLUB-HOUSE, NEW YORK, N. Y. MESSRS. GAMBRILL & FICKEN, ARCHITECTS, NEW YORK.

LAFAYETTE SQUARE PRESBYTERIAN CHURCH, BALTIMORE, MD. MESSRS. DIXON & CARSON, ARCHITECTS, BALTIMORE, MD.

THIS church is on an inside lot, that is, dwelling-houses occupy fully the lots on either side of it. It is built of stone and has a terra-cotta cresting.

CORRECTION. — We regret that a typographical error made us, in our last issue, give the name of the architect of the design for the Union League Club-House, reproduced with that number, as Mr. Ralet instead of Mr. Raht.

CORRESPONDENCE.

ARCHITECTURE AT THE ROYAL ACADEMY.

II. LONDON, May 28, 1879.

RESUMING our notice of the works at Burlington House, with the contributions of the youngest architectural associate, Mr. Waterhouse, we find him represented by three drawings, all in his familiar coloring, and, for the matter of that, in his own familiar phase of Gothic. No. 1094, the Interior of New Court, Carey Street, Lincoln's Inn; No. 1101, the Office of the Prudential Assurance Company, Holborn; and No. 1102, New Buildings at Pembroke College, Cambridge. The first two are remarkable as works in brick and terra-cotta, but they look hard and crude in many points, — not nearly such artistic buildings as they are drawings. In the latter sense New Court, with the fine group of trees in the centre of the court, is most charming. We do not think the Assurance Office one of Mr. Waterhouse's happiest efforts, so it is with all the more pleasure we turn to his work at Pembroke College, which, on the contrary, is one of the best bits of design he has lately done. It is also more English than most of his work, and so more appropriate than other things he has done, at both Oxford and Cambridge. The buildings, which seem to comprise a hall and some students' rooms, are in red brick with stone finish, and the hall is very good indeed, while another block with a tower farther off on the right might be anywhere but in a college quad. The drawing is again delightful. Mr. Waterhouse is thoroughly at home with his brush, and his designs lose nothing by their artistic rendering. No. 1095, House at Eastbourne, and No. 1132, House and Shop in New Bond Street, are by Mr. R. W. Edis. The former is a quiet, English-looking house in red brick. The entrance gable, with balcony on the right, shows some very good design, contrasting well with the gable to the stable yard. The Bond Street house is one of the best pieces of street architecture in the exhibition, and is shown in a very effective pen-and-ink drawing. It is in a free treatment of classic, very well detailed, with some excellent carving. The shop front is exceedingly well managed, and the house above rises with a lofty dormer towards the street. The red brick is set in bands across the front, as in another house by the same architect higher up the street, and produces a very good effect, while the curved bay-window running through two stories relieves the flatness of the front; it is altogether a very artistic piece of work. No. 1103, House in the Paris Exhibition, by Mr. G. R. Redgrave, an imitation of old half-timbered work, remarkable for nothing except to show how a good opportunity may be absolutely wasted. No. 1104, Interior of the Grand Staircase of the recently opened Shakespeare Memorial, Stratford, by Messrs. Dodgshun & Unsworth, is not nearly so good in design as the exterior: the flat arch through which the view is taken is particularly badly proportioned. No. 1108, Lansing College Chapel, by Messrs. Carpenter & Inglelow, is all vaulting and not very good at that; not by any means the quality of design we expect from Mr. R. H. Carpenter at least. No. 1112, Tower of St. Paul's Church, Manchester, by Mr. T. O. Scott: a very good tower indeed, much improved from the original design by the addition of the buttresses. It grows out well from the body of the church also. No. 1116, Sheperds Spring House, Hants, by Messrs. Dodgshun & Unsworth; a very fair study of brick and timber work, with a quaint entrance porch. No. 1117, Divinity Schools, Cambridge, by Mr. Basil Champneys, is a thoroughly artistic piece of work in late Gothic, very English and exceedingly well detailed. The drawing, which is in pen-and-ink, does not do the design full justice; it is much better in execution than the drawing makes us aware of; indeed it is one of the most satisfactory of modern works, and does its architect great credit; it has all the feeling of the university about it, vigorous and at the same time refined in treatment. The octagon turret at the side of the gable is particularly well managed, and the late character of the tracery in the windows is ably carried out with all the spirit of the old work.

While on the subject of collegiate work we may notice No. 1126, the Interior of the Chapel of St. David's College, Lampeter, by Mr. T. G. Jackson, a beautiful water-color drawing of a most delightful interior. The stalls, screen, and other wood-work are tinted a quiet sage green relieved with gold. If this is the color intended the effect must be truly delicious, nor is the architecture less successful than the color; it is a most careful study of late English Gothic quite like old work in detail and feeling, the production of a true artist. So again is Mr. Jackson's new quadrangle for Merton College, Oxford (No. 1164): though perhaps not so satisfactory as his examination schools for the same university, or so exquisite as the chapel first noticed, it is full of careful work, in the picturesque phase of classic with which his name is identified. The work proposed in the drawing seems so large as almost to amount to a reconstruction of Merton College. Looking at Mr. Jackson's two drawings, one is almost inclined to wish the new quad had more of the late Gothic and less of the nondescript classic, so much stronger does he seem to be in the former than in the latter. No. 1120, New Hospital for Consumption, Brompton, by Mr. T. H. Wyatt, is a huge red brick Queen Anne pile of no particular worth. No. 1125, another consumptive hospital design, this time shown in pen-and-ink, but to which the same remark applies, looks as if it had been designed by the yard, and has evidently heavily taxed the powers of its three designers, Messrs. Tasker, Batterbury, & Huxley. No. 1127, Potternewton Church, Leeds, by Mr. H. Walker, a good Early English interior. No. 1128, decoration of staircase at No. 1 Grosvenor Crescent — lower stages very blue, too much so; the upper stages, being greener, are much better, and the color is much superior to the ornament. No. 1134, interior of Dominican Church, Waterford, by Messrs. Goldie & Child, much in the same bad classic style as their design for the Oratory church before noticed. Messrs. Goldie & Child are much more successful in early Gothic than in this sort of thing, with which they are evidently not at all at home. No. 1138 is a pair of houses at Wandsworth, by Mr. T. E. Collcutt, in rather fussy Queen Anne. We ought to have noticed some rather nice gate-lodges, by Mr. Collcutt (No. 1093), and in 1176 he sends the interior of his house at the Paris Exhibition. We hear he had a very fine drawing of the council chamber of his New Town Hall at Wakefield rejected. Surely, somebody must have made another mistake here; probably we shall see it on the walls next year, and in a good place. For instance, why should it not have been in the place of No. 1144, design for a town hall, by William Scott, a poor design in a nondescript kind of Gothic, restless and fussy to the last degree, evidently the work of a novice in architecture? And yet it has the place of honor on one side of the gallery, clearly another mistake by somebody. Here is another case of the same, in No. 1145, so much wall space wasted on a heavy interior of designs for decorations and furniture of no earthly interest to any one but its author. There are several of these fancy interiors in the collection; the subject has been done much better a dozen times over, and they are mostly imitated from what has been seen before. After all they are only "designs," and the space they occupy would have been much more usefully taken up with representations of executed work which have been rejected, that is, if the display is supposed to represent the architecture of the year. In No. 1146 we have another of Mr. Walker's churches, Armley, Leeds, also very fair work; and in No. 1150, the Windsor and Eton Albert Institute, by Messrs. Bacon & Bell, a very ordinary Gothic structure. Passing over several decorative and other designs of more or less merit, we notice one of a portion of ceiling decoration at Longleah, by Messrs. Crace & Son (No. 1162). This is a noteworthy exception to the general run of the designs we have been speaking of. It comprises a series of figure subjects in panels, vigorously drawn and well colored, good both in tone and execution. No. 1161, design for Yarmouth Town Hall, by Mr. W. C. Brangwyn; a Gothic design of considerable merit, — by the way, the accepted design in this competition is not here. No. 1171, the Great Barn at Harmondsworth, an effective drawing of a most interesting piece of old work, by Mr. G. R. Webster. No. 1172, proposed tower for Mary's Church, Brighton, by Mr. William Emerson; a noble-looking tower, but with a rather long belfry stage. No. 1173, the selected design for the Consumptive Hospital, Hampstead; a château-looking building in a free treatment of classic, by Mr. T. Roger Smith. It ought to look very well on the picturesque site at Hampstead.

No. 1177, southwest view of Adcote, Shropshire; the diploma work deposited by Mr. R. Norman Shaw on his election as an Academician; the most beautiful pen-and-ink drawing in the room, as it is probably also the most thoroughly artistic design in the whole collection. Mr. Shaw has here returned to the late Gothic work of which he was the most accomplished exponent before he devoted himself to the revival of Queen Anne, and no work he could have chosen for the gallery of the academicians could better represent his powers as an artist than this. It is simply perfect; no eccentricities mar the quiet spirit of the work, truly English, picturesque without any forcing whatever; all seems to come quite naturally from the requirements of the plan. The contrast of light and shade, of form and feature, is admirable; it would be simply hypercritical to begin finding faults, rather let us be thankful the best traditions of English architecture have not died out of the land quite yet. No. 1178, façade for St. James's Church, Marylebone, by Mr. G. G. Scott; this is a design for a new front for the church of the well-known Mr. Hawis. As the reverend gentleman is very fond of music, we presume this accounts for the unusual array of fine belfries ranged along the front; but apart from this, the style, which is Italian, is carried out with considerable originality of treatment, and no small merit. No. 1182, the Bank at Colchester, Mr. E. C. Lee, a vigorous example of secular Gothic applied to business purposes, and shown in a very good pen-and-ink drawing. This is a very telling piece of work, carried out with great spirit, and excellently detailed.

The corbelling out of the first floor window, with the parapet and dormers above, are striking features; it is altogether very ably designed. We had almost overlooked No. 1163, Carlyle House, by Mr. A. Croft, a notable addition to the Queen Anne houses on the Chelsea embankment. The design is a very fair example of the now familiar style, and seems able to hold its own among the works of greater names.

There are several more or less creditable drawings of old work and other studies; but we have on the other hand no illustrations of several well-known works executed or in progress during the year. As we have said before, the space devoted to the "Mother of the Arts" is smaller than ever, part of that valuable space is taken up by drawings which should never have been there at all, and if all is true that we hear about the unusual number of rejections, surely some of them would more worthily have represented the architecture of the year, than numbers of the accepted, which represent next to nothing, and are not even interesting as drawings.

ARCHITECTURAL FOLIAGE.[1]

The Romans carried out the enrichment of their mouldings with sculpture to a greater extent than the Greeks, and they also enriched their friezes with many fine arrangements of foliage associated with animal form. But besides these they enriched many of their plain surfaces with sculptured foliage, as in the architraves of their entablatures, as well as the coronas and soffits of their cornices. Showing also their increased partiality for foliage, they greatly developed and perfected the Corinthian capital, but not only that, they added foliage to the Ionic capital, producing what has been called the composite, and so considerably enhancing its beauty as an enriched capital. They panelled too some of their pilasters with grand and magnificent foliated scroll-work. But with the exception of these last, this decoration must have been placed at too great an elevation to have been properly seen. It was left, however, to the modern European to carry out these antique styles devoid of *all* enrichment or sculpture, except long lines of bare moulded form. He is the only artist who deliberately sits down and wastes his time over the contours of quirks and ogees, and by the aid of the plasterer's mould runs his entablatures, and borders all his windows and doors, with his surprising combinations of mouldings. His plain surfaces are relieved only by scratching upon them lines to indicate colossal blocks of stones.

I would, however, call your attention more particularly to the improper application of decorative sculpture. We have been told by one whose authority upon such points cannot be too highly valued, the late Mr. Owen Jones, as well as by Pugin and others, and I suppose we all acknowledge it to be true, that construction should be decorated, and that decoration should never be purposely constructed. Yet we constantly see buildings erected where the so-called decorations are added to or applied upon the architecture, as if the very opposite were the rule. Buildings, in many instances, have become overloaded by applied ornament, instead of its being formed naturally out of the construction. Festoons and swags of gigantic size are pinned up to the surface of the walls by pateras or lion heads, and tied there by impossible ribbons, while little window pediments are broken in the centre in order that their cornices may be piled up with immense loads of sculpture or foliage. In many modern French ceilings festoons of *papier mâché* are frequently introduced, actually hanging away from the ceiling, looped up by their extremities. Surely if enrichment is a portion of architecture, and an integral part of it, no greater violation could be imagined than thus to separate or hang it up, as if ready to fall upon the spectator's head. Unfortunately there is a precedent found in antique architecture for these applied forms. The Corinthian capital is not a composition which grows out of and forms a part of the column itself, like the grand old Egyptian capitals, but all the parts are applied or added outside the bell, which is the actual capital — a circumstance which, to say the least of it, has greatly aided the labors of the modern plaster-caster; but it is not composed upon such principles as should be the rule in architectural ornamentation.

It will be considered, no doubt, very fastidious and even presumptuous upon my part, thus to condemn a form of capital which has received the support of so many centuries. I am not, however, the first to point this out; the object, however, is not so much to find fault with the Corinthian capital, which doubtless will still continue to be admired, and be most faithfully copied for many generations to come, but to endeavor to point out the defect which, more or less, runs through Greek and Roman architecture. Although it may not be a very prominent fault in antique examples, yet it has given rise to most unfortunate results in modern times.

No period in modern English architecture is more justly noted for foliated carving than that belonging to the school of Sir Christopher Wren, at the head of which stood Grinling Gibbons. For skill in workmanship, dexterity of manipulation, and close imitation of nature, this period stands perhaps higher than any previous or later one. It is, however, to be regretted that so much of this remarkably beautiful carving should be afterwards applied and added to the construction which it is intended to enrich. Ornament, to be true, must be subservient to the purpose and to the architectural forms of the work itself. The features themselves should be enriched, and as a general rule ornament should be taken out of the material — sunk below the surface and not laid upon it. A work may be literally covered with ornament which will immeasurably aid the beauty of the architecture when used in its legitimate place, as in the walls of the Alhambra, or to take a more humble but not less striking example, in the elaborately carved but simple form of an Indian sandal-wood box: it is enriched without anything being added to it, or altering its primitive form or construction.

The great defect of modern ornamentation is that it is so often represented as if it had weight in itself and that it was absolutely necessary to hang it up, or that it should stand upon its own base, as in many of the otherwise very beautiful Italian arabesque pilasters.

The festoon, as a means of ornamenting a work, has been used in French and Italian Renaissance more than any other form, but it is essentially a bad one, and it is at the same time one of the most objectionable forms of constructed ornament. From its very nature it is *added* to the thing ornamented; it often overlies architectural features, and is formed of an artificially constructed collection of miscellaneous flowers and fruit. Unhappily it appears to have been coming into fashion again of late. Its origin, there cannot be a doubt, was derived from the Roman altars, which were decorated in the earliest times with the actual heads of the animals which were sacrificed. These were placed at the angles of the altar, and festoons of flowers were looped up from the horns and tied with ribbons. They were afterwards carved upon the altars in stone or marble, and from them the same decoration was soon transferred to the friezes of the temples. It therefore became a precedent for architectural decoration, and has been used ever since in every conceivable position; in festooned bands round buildings; under windows and over windows; over doorways; over arches and between arches; between capitals or attached columns or pilasters; hung from eye to eye of voluted capitals and consoles, as well as on ceilings and on mosaic floors — in fact, there is scarcely any position in which the festoon has not been used. Again, festoons are not only made up of all manner of flowers and fruit, strung together without any cohesion of parts, but of nearly everything that can be imagined, such as musical instruments, books, dead birds, shell-fish, and a multitude of other objects, as well as the ever indispensable ribbon.

Grinling Gibbons appears never to have been able to get on without festoons, ribbons, and drops or pendants in his work. The example of a panel from St. Paul's Cathedral is a good specimen of this. It is executed in the usual manner that he adopted for nearly all his most important works: that is, it is carved in lime-tree and planted upon an oak panel. The composition is rich and bold, but somewhat confused, and at first sight the manner in which it is composed cannot be clearly distinguished. In the centre there are a pair of crossed trumpets tied together by a ribbon. Then there are in the upper part interlacing scrolls of a conventional type peculiar to Grinling Gibbons — for which in my opinion he deserves more credit than for any other part of his work, but to which I will refer presently. Out of the upper part of the scroll (I am now explaining one half of the panel) there drops a swag or festoon of small flowers, either periwinkles or primroses, which runs to the upper angle of the panel, and from which, hung to a single flower, drops perpendicularly a bunch of trilobed leaves, forming the end of the design. But besides this there is a larger and bolder swag, which is in much higher relief than any other part, extending from the knot of the ribbon at the junction of the trumpets, sweeping to the bottom of the panel, and going right up to the extreme angle again, from which the smaller festoon and drop hang. This is repeated in the other half of the design; all, except the scrolls, being supposed to be hung up by artificial means. A portion hangs from the scrolls, but how they and the angle flowers are supported does not appear.

The peculiarity of the scrolls which appears to be characteristic of Gibbons's work is that instead of the leafage forming a sheath, as in nearly all classical foliage, it grows out of the stem itself, or arises from the other side of the stem, as in the examples from St. Mary Abchurch. The leafage is from nature, taken evidently from the hawthorn, and in some cases from the celery-leaved crowfoot. In richer work, as at St. Paul's, the leaves are double: that is, one lapping over the other. A defect in these latter scrolls is that they grow in two directions: that is, out at both ends, which might have been easily avoided. Some of the best and richest of Gibbons's scroll work of this kind, of great excellence and beauty, is to be found in some richly ornamented and pierced oak doors in the library of Trinity College, Cambridge.

The fruit and flowers in the festoons are all accurately and very beautifully copied from nature; they consist of peonies, anemones, crocuses, primroses, tulips, peaches, peas, and other fruits. All are separate and disconnected, except occasionally by some faintly carved lines or strings at the back. No part is growing, but is in "still life;" the fruit or flowers are separately fastened in their places by means of screws, nails, and glue, and when in very high relief, they are not worked out of one solid piece of lime-tree, but are formed of different layers of wood, about two inches thick, placed one upon another. There is no undercutting, properly so called, as the whole is backed off behind, and shaped previously to its being planted on the ground, which gives the work as much relief as if it consisted of actual flowers. This is not the case with the oak scroll-work which I have

[1] Selections from a paper read before the Royal Institute of British Architects, by James K. Colling, F. R. I. B. A.

mentioned as that from St. Mary Abchurch, and the library of Trinity College, Cambridge, which is all carved out of the solid.

It will be perceived that the panel to which I have referred is made up in two different styles: the natural in the festoons, and the conventional, as seen in the scrolls. Now this manner of mixing up the natural and conventional is common to most of the foliated work of the Renaissance period. Natural ivy, vine, oak, and other leaves as well as fruit, are introduced occasionally among foliage which may be described as purely architectural, and in such an incongruous manner that they never properly amalgamate with the other portions of the composition. Gibbons went in boldly for nature in his own style, and whenever he adopted the natural he made the conventional quite subservient. But in the French and Italian the natural is usually introduced as if it were only an accessory. There were some exceptions, as in the border round Ghiberti's doors, which is entirely natural; but, as a rule, nature was introduced but timidly. There are many examples, however, even among Roman work, where natural foliage was thoughtfully and most artistically followed and worked out, as in the example from the stem of a fountain in white marble, found near Tivoli, but now in the British Museum. A spiral line is formed round the shaft or column by a serpent, and a branch of ivy grows up from below, filling up the spaces between the coils of the serpent in a very graceful manner. The natural flow of the leaves with their long foot-stalks and the bunches of berries are most faithfully and artistically rendered. Even the little buds in the axils of the leaves are introduced, showing with what minute attention they observed nature. The leaves, also, are plain and undivided, as they invariably are in nature, when found near the flower.

There are numerous other instances in Roman work, where nature has thus been studiously followed; more particularly in carvings from the vine, oak, and ivy. Now what I want to elucidate by this is, that as there have been artists, even in ancient times, who have made a close and successful application of nature to art, by entirely throwing over the conventional treatment of their times, we, in the present day, should, like the ancient Roman who sculptured that beautiful stem of a fountain, throw aside all architectural precedents for foliage, except the principles upon which he worked, and boldly make our applications directly from nature. But instead of doing so, we, like many of the Renaissance workers, who also strove to reintroduce nature, are so bound by conventional rule, that we are not likely, from this timid mode of proceeding, to succeed but in a partial degree, and by adopting two different manners we must fail in harmonizing them.

Artists and carvers are told by architects, and one hears it continually held up as law, that foliage for architectural purposes *must* be highly conventionalized, that it must not be too natural, and so on.

I was in a church the other day, which had been lately restored, and I remarked to the clergyman, "Why, what commonplace designs all your new poppy-heads are." "Oh, yes," he replied, "our architect prefers them; the carver wanted to make some of them different, but the architect would not allow him to do so, but would insist upon his copying the old ones." In this manner, which is only too common a case, we are constantly trying to resuscitate the ornament of former ages. This plan will never lead to any good result, and will bring with it nothing but disappointment. For whether we essay to design in the style of the Greek, or the Roman, or the Gothic (for instance, as in the manner of the very beautiful foliage of the Early-English period), however much we may admire these works, they are all things of the past, and we never can by any mode of copying or adaptation make them applicable to the nineteenth century. There is therefore a paramount necessity for again having constant recourse to nature as the main element of the beautiful for architectural foliage.

SLOW-BURNING CONSTRUCTION.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — If you can spare a little more space for discussion of the subject of slow-burning construction, I would like to make a few comments on E. A.'s last letter, and hope that my reply may be half as interesting and instructive as his communication.

Before proceeding to practical matters, I wish to defend the profession from being considered responsible for school-house construction. How much the real architects have to do with such buildings may be inferred from a little story, to which I imagine there are many parallels. A member of the Institute once submitted designs in competition for a school-house in a certain city. He was afterwards told that his design was adopted, but for a long time heard nothing further. Being a gentleman, and unwilling to importune the committee, he waited until one day, passing the spot, he saw his school-house half built. He applied to the committee for an explanation, and was told that he was too expensive an architect for them, and they had found one who agreed to take his sketches and make the working drawings and specifications for forty dollars, and they had given him the job. I venture to say that it is the forty-dollar architects who have done the larger part of the school-house construction, and between them and the committees who employ them, the public gets all the safety and convenience that it need expect.

However, I am far from claiming that architects do all that they might in promoting good construction. Long habit, the opposition of builders, and the indifference of owners have induced careless ways which are much to be regretted; but I think that few of the respectable ones are unfamiliar with most of the precautions which E. A. mentions. At the same time there are many details about which they would be glad to learn from one who certainly shows himself well qualified to inform them. In the hope that he will be disposed to give us the benefit of his experience, I will make a few inquiries, rather than criticisms, about the mode of factory construction which he describes, with reference to its application to more finished buildings.

First, of the hollow walls. I suppose he would build hollow walls with brick ties, as by so doing he can get his air-space, and increased thickness of wall, with the use of very few more brick than would be needed in a solid wall of the same length and height. But in walls to be plastered, the brick ties are hardly admissible, as moisture is conducted across by them from the outside to the lining wall, and shows itself in the plaster, where that is put directly on the lining wall, without furring strips. The stains might not be important in school-houses, compared with the superior safety to the structure. I leave that for committees to decide. But in houses or public halls the risk of ruining expensive paper or decoration is very great. I have heard of brick-tied walls which were dry, but they must be rare exceptions. The usual way of meeting the difficulty is by using hoop-iron ties for connecting the wall and its lining. This is effectual, where well done, but expensive; as a lining so tied adds nothing to the stability of the outside wall, which must be of full dimensions without it, and the cost generally determines the use of the much cheaper furring and lath. If E. A., or any one else, knows of a way to keep with certainty a brick-tied hollow wall dry, he will confer a public benefit by describing it.

The floors and roof used in the factory construction are admirable. Three-inch plank, covering heavy girders, with inch flooring on top for a finish, present a solidity as pleasing to the practical man as the opportunity for picturesque interior effect is attractive to the artist, and to bring such construction into general use is worth a strong effort. It would not be cheap, for the casing, moulding, and decoration which would be essential to bring the rough girders and plank into a form satisfactory to the public eye would cost many times as much as the plaster which it superseded, and it would be difficult to insist on the necessary solidity. Where one inch of boarding above the beams was strong enough to bear the weight upon it, and gave the same opportunity for finish, it would be hard to induce the owner of a house to spend four or five hundred dollars more for mere dead-weight of lumber, and yet without this extra thickness the open construction would, I presume, be less safe than the ordinary plastered ceiling. In the Oak Bluffs cottages such a mode of building is universal, and the rate of insurance there is, I believe, one per cent per annum.

E. A. describes his partitions as consisting either of brick walls, or solid plank, plastered, or studding with wire-lath and plaster put on in such a way as to cut off the passage of fire, even on the studs to which the lath is fastened. Brick would be too expensive for houses, and plank partitions would transmit sound, and would buckle under the weight of the floors, unless very thick, or interrupted by posts, and I should be glad to know how the studding is protected against the passage of fire by the wire-lathing. Most architects bridge their partitions, thus cutting off the direct draught, and many lay from two to five courses of brick between the studs at each floor, and would be pleased to learn of any more efficient protection.

I am also desirous of further information as to the merits of wire-lathing. I have used it in plastering over hot-air pipes carried up in stud partitions and similar cases, but the protection it would afford to the studding itself would seem to be quite limited, while the cost is considerable. The combustion of the laths, nearly surrounded by plaster, would be slow, compared with that of the studding, and the advantages of the superior key which the wire lath gives can be secured in other ways at much less expense. At fifty cents per square yard for the wire, a stud partition lathed on both sides with it, would cost quite as much as the same partition built of hollow concrete blocks, and the latter would be absolutely fire-proof, while as the specifications say "the circulation of air and mice" would not necessarily be impeded by wire, any more than by wood lathing. Add to this the rapid corrosion of the wire, if the mortar should be for any reason gauged high enough with plaster of Paris to give it an acid reaction, and the indications seem to be in favor of looking to concrete for such purposes, rather than to iron in any form. But this is just the subject about which I wish to learn, not instruct, and I gladly yield my place in the discussion to others better able to continue it.

I am afraid that E. A. thinks it a little unreasonable for architects to be unwilling to send sketches of their ideas of what a mill should be, and a reference to Mr. Whiting's design, as E. A. describes it, may illustrate the difficulties in the way of one, however skilful in other branches, who attempts to construct *a priori* a plan of the kind. Few architects would dream that an acre of ground, to be used for a manufacture requiring, it would seem, abundant light, could best be covered by a structure 136 by 330 feet in plan. That such a building would be cheap, economical in heat and artificial light, would be plain enough, but to propose to put the operatives in the middle portion of the room at such a distance from any light and air but what could be obtained from skylights would, I should

say, put a man *hors de concours* at once before a professional tribunal. This is not by way of criticism on Mr. Whiting's plan, — of course he knew what he was about, — but simply to show how necessary it is for the best architects to expend much time in study of any subject not perfectly familiar to them before their sketches or suggestions would be of much value, and as most of them realize this, the response to such an invitation would be very feeble. C.

CHRIST CHURCH, GERMANTOWN, PA.

506 Walnut Street, Philadelphia, June 16, 1879.

To the Editor of the American Architect:

Dear Sir, — Will you please correct the statement in your last issue, that Mr. H. K. Marshall, of New York, is the architect of Christ Church, Germantown. My design was unanimously adopted by the Vestry in the beginning of the winter, and has been under contract for several months. Yours faithfully,

James P. Sims.

PUBLICATIONS RECEIVED.

Bevis's Builders' Price Book for Architects, Engineers, Surveyors, Builders, and Contractors, and Guide for Estimates. By Henry C. Bevis, Surveyor, etc. London: H. C. Bevis & Co. 1879.

NOTES AND CLIPPINGS.

As it is desirable to mail with the last number of a volume the index of that volume, our issue for next week will be somewhat delayed in its delivery, though probably not more than a day or two.

The New York Department of Buildings. — The investigation which we mentioned some time ago as making into the conduct of Mr. Henry J. Dudley, Superintendent of Buildings in New York, appears to have been abandoned, because after several fruitless sessions had been held it was found that one of the signers of the affidavit which gave cause for the investigation was not a tax payer. As this was a violation of the charter the proceedings were quashed.

Public Buildings. — Mr. Murch, in behalf of the Committee on Public Buildings and Grounds, submitted to the House of Representatives on June 10 the following resolution: —

"*Resolved*, That the Committee on Public Buildings and Grounds be, and are hereby, authorized and directed to inquire into all matters pertaining to the preparation and furnishing of all material for the construction of public buildings and the manner of constructing the public buildings of the United States under the different systems adopted by the Government of the United States, and to report to this House by bill or otherwise what legislation is necessary to secure good material and good and suitable work at fair and reasonable compensation to the mechanics and workmen employed on public works; and said committee are further instructed to inquire into all expenses pertaining to the erection of the public buildings of the United States, and to make all such further inquiries as they may deem proper. And said committee are authorized to send for persons and papers and to administer oaths. And said committee are further authorized to employ a stenographer at a fair compensation. And said committee are authorized to appoint a sub-committee of its own members, for the purpose of pursuing these investigations; said committee when appointed to have all the powers conferred by this resolution. And said committee or its sub-committee may make their investigations either at the city of Washington or at any of the cities or other places where public buildings are being erected or material prepared, as they may deem proper. And said committee or its sub-committee may sit during the sessions or recesses of Congress; and the expenses attending the carrying out of these investigations shall be paid out of the contingent fund of the House of Representatives, not to exceed $5,000, and the Clerk of the House of Representatives is hereby authorized and directed to pay the same."

The resolution has been referred to the Committee of the Whole.

The Voyage of the Dorian. — The State Department has received a despatch from the United States Consul at Constantinople, which states that Mr. J. T. Clarke and Mr. F. H. Bacon have reached that city in the Dorian, a sloop-rigged boat of about two tons' measurement. These are the two gentlemen whom we have mentioned as making an expedition, under the auspices of the Boston Chapter of the American Institute of Architects, and of certain gentlemen interested in the subject, to Greece and the Grecian islands, to examine the Doric remains. Mr. Clarke is reported to nearly have lost his life in a heavy gale which was encountered probably in the Black Sea, and not on the voyage across the Atlantic, as the newspaper states, — for the voyage of the Dorian began from London and not from Boston. The Dorian has made her way to Constantinople by going up the Rhine, until stopped by the low water in a certain canal, through which her course lay, which forced her crew of two to take her by rail to the upper waters of the Danube, down which she sailed to the Black Sea and thence to Constantinople.

Mirror Photographs. — The *Deutsche Allgemeine Zeitung* makes the incredible statement that a German, named Karl Steinbach, has made an important discovery in photography. After years of study and experiment, he has succeeded in obtaining a chemical composition, by means of which a mirror image may be fixed and sold as a photograph. With this composition the mirror surface is painted, and the back part of the mirror receives also a coating of oil. The mirror thus prepared is held before the person who is to be photographed. The oil coating evaporates, and the likeness of the person remains in natural colors on the light surface. The image, so fixed, is brought into a bath, and is exposed half an hour to sunlight, before delivery. A rich capitalist in Peru, it is said, has acquired this invention for $400,000, and large establishments are to be formed in North and South America for carrying it out.

The Mexican Exhibition. — It is said that the Mexican International Exhibition has been abandoned.

A Parliamentary Report on the Electric Light. — A dispatch says that the Parliamentary Committee's report on electric lighting says that sufficient progress has been made to encourage the belief that electricity has an important future for illuminating and as a source of mechanical power. The electric light, even in its present state of development, may be advantageously used for large areas, whether open or closed; but it is not so far matured as to compete with gas for domestic purposes. The committee therefore do not recommend any legislation for applying the light to private purposes, but do recommend that no legislative restrictions be allowed to impede its further development. The committee think sufficient power already exists for applying it to open spaces and large centres; but if such power do not exist, it should be granted under proper regulations. They consider, however, that the time is not yet ripe for allowing private companies to break up streets in order to supply electric light, but they advise that municipal authorities should receive all possible help for public lighting by electricity, and that the Legislature should be willing to give all reasonable facilities for extending the use of the electric light where proper demand for it shall arise. They consider that for lighthouse purposes the electric light has established itself, but they have not been able to satisfy themselves, from the evidence, that electric lighting is economical as compared with gas.

Lighting the Capitol by Electricity. — A Washington (D. C.) dispatch of the 5th inst. says: "The arrangements for lighting the Capitol building with a new electric light are nearly completed. The experiment has already been made in the hall of the House of Representatives, and a single light placed on the front row of the reporters' gallery and over the Speaker's chair made the whole hall so light that print could be easily read at the points farthest from the burner. The plan is to place four lights in the hall, and it is now believed that they will be a very great improvement upon the present arrangement of gas-burners. Three electric machines have been purchased under the appropriations for lighting the interior of the building, and it is in contemplation to place another in position for the purpose of supplying a light of vast power upon the top of the dome. It is claimed by the inventors that a burner can be constructed there which shall have a very appreciable effect upon a large area of the city. It is claimed that with the steam power of the heating and ventilating apparatus in each wing of the building, a dynamo-electric machine of 175,000 candle-power can be run."

The Missouri River. — To be appreciated it [the Missouri River] must be seen and heard during the April or June rise, when its waters are red and thick with the powdered soil they have brought from the mountains and stolen from the farms in the valleys. Then it pours, and swirls, and eddies along with a treacherous sound between a chuckle and a half-suppressed whisper, that repels while it fascinates the listener. It has made millions of acres of rich black deposits, on which it still holds a mortgage, the foreclosure of which no man can foresee. Hundreds of farmers, after clearing away the heavy timber and raising fine crops year after year, on their eighty or more acres of deep, inexhaustible river bottom, have seen their entire possessions swept away in a few days by a sudden and unexpected "change of channel" during an April or June "rise." These changes of channel have different causes. Sometimes a giant cottonwood tree that has been uprooted where the river has raised upon the forest above, is borne down by the current and lodged in the mud, where it will gradually become imbedded in the yielding bottom, and perhaps lie in wait for months, or even years, without giving any particular sign of existence. At last an unusual rise takes place, and then this hidden "snag" creates a diversion in the strong current, which begins to circle round the spot, and which culminates in a boiling eddy. The eddy increases in depth and force, gradually diverting the water from its former course until a new pathway is formed in the river bed. If the eddy is located near the shore at the upper edge of a promontory, and the water is sufficiently high to overflow the flats, a new channel is sometimes carved straight across some valuable farm or timber strip, and a river town, where steamboats took freight and passengers last year, may be from two to six miles distant from navigable water next year. A few years ago Forest City, Mo., was kissed day and night by the dirty lips of this Western flirt. To-day the river sports miles away, out of sight of the old cave, and is whispering soft things to White Cloud on the Kansas side, which has gained a river, while the State has lost several thousand acres of productive cotton land that now supports cattle and hogs in Missouri. Missouri River towns are never safe, except when located on bluffs, or tablelands, like Omaha, White Cloud, St. Joseph, and Kansas City. — *St. Paul Pioneer Press.*

Absorption of Water by Wood. — M. E. J. Maumené finds that the absorptive power varies in different woods, when dried in a vacuum, between 9.37 per cent and 174.86 per cent. The maximum, 174.86 per cent, or $\frac{7}{4}$ of its own weight, is found in chestnut timber. The moisture contained in wood in its ordinary state varies between 4.61 per cent and 13.56 per cent. The absorptive power varies but little in different samples of the same wood. — *Les Mondes.*

Roman Remains near Dueren. — The *Cologne Gazette* states that the Villa of Marioweiler, near Dueren, has turned out to be a perfect mine of Roman ruins. Enough of the villa has now been laid bare to allow of the apartments of the bath being marked off with considerable precision — viz., the tepidarium, the caldarium, and the frigidarium. A part of the stove and of the hot-air clay pipe has also been excavated. A tile bearing an inscription has likewise been found. It is not yet definitely deciphered, but seems to bear the date of the 11th year of the reign of Augustus — that is, 19 B. C. Photographs of all the finds are being made. The coins found date back to the fourth century. A number of articles, including a lock, spear-heads, jugs and pitchers, and a serving dish, have been collected from among the broken tiles and other rubbish which encumber the foundations.